

CLAIMS

WHAT IS CLAIMED IS:

- 1 1. A method of making a device comprising:
2 forming two electrodes;
3 creating an electric field between the two electrodes; and
4 forming a waveguide between the two electrodes in the presence of the
5 electric field.
- 1 2. The method of claim 1, wherein the two electrodes are lithographically-defined
2 on a substrate.
- 1 3. The method of claim 2, wherein the waveguide comprises an organic crystal
2 material.
- 1 4. The method of claim 3, wherein the organic crystal material comprises an
2 organic molecule comprising:
3 a doner portion, and
4 an acceptor portion coupled to the doner portion via a conjugated backbone.
- 1 5. An electro-optic modulator comprising:
2 two electrodes; and

3 a waveguide disposed between the two electrodes, the waveguide comprising
4 an organic crystal.

1 6. The electro-optic modulator of claim 5, wherein the organic crystal comprises:
2 a doner portion, and
3 an acceptor portion coupled to the doner portion via a conjugated backbone.

1 7. The electro-optic modulator of claim 6, wherein the conjugated backbone
2 comprises an aromatic ring.

1 8. The electro-optic modulator of claim 7, wherein the aromatic ring is a benzene
2 ring.

1 9. The electro-optic modulator of claim 5, wherein the waveguide was formed in
2 the presence of an electric field created between the two electrodes.

1 10. The electro-optic modulator of claim 5, wherein the waveguide is a non-
2 centrosymmetric organic material with substantially aligned dipole moments.

1 11. The electro-optic modulator of claim 10, wherein the dipole moments were
2 aligned using an electric field created between the two electrodes.

1 12. A method of making an electro-optic modulator comprising:
2 forming two electrodes on a substrate;

3 depositing a dielectric layer at least partially between the two electrodes;
4 creating an electric field between the two electrodes;
5 forming a waveguide over the dielectric layer in the presence of the electric
6 field; and
7 depositing a top cladding over the waveguide.

1 13. The method of claim 12 further comprising:
2 polishing the waveguide prior to depositing the top cladding.

1 14. The method of claim 13 further comprising:
2 polishing the waveguide down to a top surface of the two electrodes.

1 15. The method of claim 12, wherein forming of the waveguide further
2 comprises:
3 growing a crystal by a controlled cooling of a melt .

1 16. The method of claim 15, wherein the crystal comprises an organic molecule
2 comprising a donor, an acceptor, and a conjugated backbone.

1 17. The method of claim 12, wherein forming of the waveguide further
2 comprises:
3 growing a crystal by controlling a rate of evaporation of a solution.

1 18. The method of claim 17, wherein the crystal comprises an organic molecule
2 comprising a donor, an acceptor, and a conjugated backbone.

1 19. The method of claim 12, wherein forming of the waveguide further
2 comprises:

3 aligning dipole moments of the waveguide with the electric field as the
4 waveguide crystallizes.

1 20. The method of claim 12 further comprising:

2 applying a voltage to the two electrodes to modulate a light signal in the
3 waveguide.

1 21. A method of changing a phase of an optical signal in an electro-optic
2 modulator comprising two electrodes and an organic crystalline waveguide situated
3 between the two electrodes, the organic crystalline waveguide having dipole moments
4 substantially aligned in a common orientation, the method comprising:
5 introducing the optical signal into the organic crystalline waveguide; and
6 applying a voltage to the two electrodes.

1 22. The method of claim 21, wherein applying the voltage to the two electrodes
2 changes a refractive index of the organic crystalline waveguide.

1 23. An optical system comprising:

2 a laser;

3 an electro-optic modulator comprising two electrodes and an organic crystal
4 waveguide between the two electrodes, the waveguide having its dipole
5 moments substantially aligned in a common direction, the waveguide
6 positioned to receive a light signal from the laser, the electrodes of the
7 waveguide coupled to a signal input.

1 24. The optical system of claim 23 further comprising:
2 an amplifier to amplify a modulated light signal from the electro-optic
3 modulator.

1 25. The optical system of claim 24 further comprising:
2 a MUX/DEMUX coupled to the electro-optic modulator.

1 26. The optical system of claim 25, wherein the MUX/DEMUX is an array
2 waveguide grating.

1 27. An electro-optic modulator comprising:
2 a splitter;
3 a coupler; and
4 a phase modulator comprising an organic crystal having its dipole moments
5 substantially aligned in a common direction, wherein the splitter is
6 coupled to direct a first portion of a light signal to the phase modulator
7 and a second portion of the light signal to the coupler, and the coupler

